by the Admiralty and by the Ministry of Agriculture and Fisheries, and is the standard form of current meter now used by both Departments.

In the new chap. xx. the "Douglas-Schäfer" sounding traveller is described on pp. 434–36, but as this is the official method of obtaining soundings in H.M. surveying vessels, it would have been more suitably placed at the commencement of this chapter than among the miscellaneous collection of methods which are largely experimental.

Several new methods connected with sweeping are now described in the new material of the book, and all have something to be said in their favour; but it is much to be hoped that the results of mine-sweeping, which developed into such a gigantic and well-organised piece of war machinery, will eventually assist in the devising of some form of thoroughly effective sweep for surveying purposes.

This last remark applies similarly to the improvement of surveying devices and methods generally. During the war such enormous progress was made in so many directions affecting scientific developments that many surveying methods must of necessity be entirely, or at least very drastically, altered to bring them up to date. The remarks under the heading Recent Developments" on p. 470, which deal with this aspect, are, however, distinctly on the conservative side, as it is considered that the scrapping of old systems must be adopted in a very wholesale manner rather than that attempts should be made at their modification to conform to the most modern methods. It is perhaps somewhat difficult to appreciate what an enormous saving of time, and, therefore, of expense and labour, will eventually result from the introduction of many of these methods into hydrographical surveying, but a good example will be found in connection with the use of hydrophones, by the aid of which accurate positions afloat can be obtained in as many hours instead of days or even weeks, which would have formerly been required under the procedure described under the heading "Triangulation by means of Floating Moored Beacons" in the new chap. xxi.

The war, in fact, has shown the necessity in this, as in so many other directions, of revising the text-books which deal with technical subjects, and this is the condition of affairs as regards hydrographical surveying. The work under notice is undoubtedly the standard publication on the subject, and has a well-deserved and world-wide reputation; but it is considered that all such standard works on technical matters, such as that now under discussion, should be prepared and published by the Government Department which is directly concerned, and, therefore, in a position to obtain the fullest information in every possible direction; and lastly, but not least in importance, which is also in a position to keep such an official work always up to date by the periodical publication of supplements.

Forestry, Tree Diseases, and Timber.

(1) *Our National Forests: A Short Popular Account of the Work of the United States Forest Service on the National Forests.* By Dr. Richard H. Douai Boerker. Pp. lxix + 238. (New York: The Macmillan Co.; London: Macmillan and Co., Ltd., 1918.) Price 12*s.* 6*d.* net.

(2) *Commercial Forestry in Britain: Its Decline and Revival.* By E. P. Stebbing. Pp. vi + 186. (London: John Murray, 1919.) Price 6*s.* net.

(3) *National Afforestation.* By A. D. Webster. Pp. 160. (London: T. Fisher Unwin, Ltd., 1919.) Price 6*s.* net.

(4) *Manual of Tree Diseases.* By Dr. W. Howard Rankin. (The Rural Manuals.) Pp. xx + 398. (New York: The Macmillan Co.; London: Macmillan and Co., Ltd., 1918.) Price 12*s.* 6*d.* net.

(5)–(8) *A Map of the World (on Mercator's Projection), Having Special Reference to Forest Regions and the Geographical Distribution of Timber Trees: Timber Map, No. 1. North America: Timber Map, No. 2. South America: Timber Map, No. 3. Europe and Africa: Timber Map, No. 4.* All prepared by J. Hudson Davies. Each on rollers, size 40 in. by 30 in. (Edinburgh: W. and A. K. Johnston, Ltd.; London: Macmillan and Co., Ltd., n.d.) Price 8*s.* net each.

(1) DR. BOERKER'S book is a popular account of the administration and protection of the national forests of the United States, which now constitute about a third of the timber lands in that country. The original forest area was enormous, being estimated at 850,000,000 acres. Nearly half of this has been cleared away, as the land was needed for farms by settlers; but forest fires, felling for timber, and grazing have shared largely in the destruction. To-day the land under timber trees is about 500,000,000 acres. Private ownership entailed disappearance of the forests, as no steps were ever taken to provide for the growth of a second crop of trees upon the ground. State intervention became necessary, and nothing in the political history of the United States is more creditable than the legislation of late years enforcing measures to preserve from fire and to manage

on scientific principles as much of the primeval woodlands as could be rescued from private ownership. Dr. Boerker sketches the history of this great movement.

The first effective step in conservation was the passing of an Act in 1891, which empowered the President to create forest reserves by proclamation. The first to be proclaimed was the Yellowstone Park, and others were added until they amounted to 100,000,000 acres in 1905. In that year the Forest Service was constituted as it now exists, with enlarged powers and increased appropriations from public funds. In 1907 the "forest reserves" were re-named "national forests," to do away with the impression that the timber was not to be used until some future time.

Dr. Boerker gives a list of the national forests, arranged by States, and showing the acreage of each and the headquarters of the Forest Supervisor. The national forests are nearly all in the west, comprising the higher parts of the Rocky Mountains, the Cascades, the Pacific Coast ranges, a part of the coast of Alaska, some of the hills in the Dakotas, eastern Montana, Oklahoma and Arkansas, and small areas in Minnesota, Michigan, and Florida. In March, 1915, there were 162 national forests in all, with a total area of 163,000,000 acres.

Besides the national forests, set aside out of the public lands of the west, there are mountain forests in the east, in the White Mountains and southern Appalachians, which have been gradually acquired by purchase under the Weeks law of 1911. These totalled nearly 2,000,000 acres in 1919. Under the same law the Federal Government co-operates with the States in the protection of forested watersheds, and much has been done to stop the ravages caused by fire.

In 1910 the Forests Products Laboratory was established at Madison (Wisconsin), and this great research institute has since then made signal advances in almost every phase of wood utilisation, to the great gain of the nation in times of peace and during the war. Researches have been made in wood distillation, the testing and seasoning of timber, the pulp and paper industries, tapping pines for turpentine, using wood waste, the production of artificial silk from sawdust, etc. Investigations in the industrial uses of woods have also been carried out. The attention paid to scientific research has been a significant feature of the U.S. Forest Service, as is well shown by the abundant literature on forestry subjects which has been published at Washington during the past ten years.

Dr. Boerker's book is well illustrated, and contains interesting notes on the field work in the national forests, including harvesting seed, modes of planting, diseases and insect attacks, fire protection, the building of roads, trails, and telephone lines, and the supervision of felling operations and grazing. The richness of details makes the book valuable to foresters as well as to general readers.

(2) The two small books by Mr. E. P. Stebbing and Mr. A. D. Webster narrate in a popular manner the achievements and hopes of British forestry, and are in strong contrast to the American treatise just noticed. Both authors fail notably in their historical chapters. Mr. Stebbing tries to compress into a few pages the history of the woodlands and forest policy of Great Britain from the earliest times until 1885. He bases this abstract on Nisbet's disquisition on the subject in his manual "The Forester." The fact is that the history of forestry in Britain cannot be written until it is taken up seriously, and the public records and other documents are studied and made use of.

Mr. Stebbing devotes a chapter to the various Committees and Royal Commissions appointed in the period 1885–1914 to inquire into and deal with forestry in this country. His favourable opinion of the activities of the Development Commissioners will meet with some criticism. This body did useful work from 1909 to 1914 in encouraging forestry education, but made no progress in Great Britain in the "purchase and planting of land found after inquiry suitable for afforestation," one of the main objects for which the Commissioners were appointed. The next chapter treats of the difficulties in timber supplies during the war period. In the remaining chapters Mr. Stebbing is concerned with the future of British forestry, and discusses various matters, such as the requirements of timber by Britain, what afforestation will do for the people, the connection of forestry and agriculture, the acquisition of land for planting by the State, the protection of afforested areas, etc. He is not content with the recommendations of the Reconstruction Committee for the planting of 1,770,000 acres during the next eighty years. However, we must be satisfied, in the present state of public finance, with the immense progress that has been made in the appointment last year of the Forestry Commission with a definite income and an assured programme for the next ten years. At the end of this period the problem can be reconsidered in the light of the experience gained in the meantime.

(3) Mr. Webster's small book begins with a short chapter on the history of British woodlands, which contains too little information to be of any

value. His remaining chapters deal briefly with schemes of afforestation, financial returns, trees for planting, the use of the unemployed in forestry work, the transport of timber, etc. There is nothing novel, and a good deal that is debatable, in his treatment of these subjects.

(4) Dr. Rankin's "Manual of Tree Diseases" is the first American text-book on the subject. Injuries caused by insects or other animals are not included. The first four chapters treat of general diseases, such as many species are liable to, and those affecting seedlings, leaves, stem and branches, and roots are successively dealt with. The main part of the book describes the diseases which attack various groups of trees, beginning with alders and ending with willows. Chapters on tree surgery and on spraying conclude the volume, which is fairly well illustrated. Exact and copious references to the literature of the subject are a useful feature. This manual will be of considerable use in Great Britain, although the diseases occurring here and in America are often different. The account (p. 90) of *Keithia thujina,* a dangerous fungus which has recently appeared in England and Ireland on the valuable forest tree, *Thuya gigantea,* is of considerable interest. In America it is essentially a disease of seedlings, often killing large numbers of those less than four years old. Preliminary experiments indicate that soap-Bordeaux mixture applied every ten days in autumn will greatly reduce the infection.

(5)–(8) These four maps are attractive in appearance, and will prove useful to merchants and teachers, as they show approximately the districts which yield the more important commercial timbers. Their scientific value is impaired by the fact that in a considerable number of species the areas of distribution are incorrect, and the names erroneous or confusing. For example, the small map of Old World larch is incorrect. European larch does not occur, as depicted, in the Pyrenees, Apennines, Serbia, Bulgaria, etc. The Siberian larch is wrongly styled *Larix dahurica,* whereas it is *L. sibirica* which occupies northern Russia and Siberia west of Lake Baikal. *L. leptolepis,* which is restricted to Hondo, in Japan, is represented as existing on Hokkaido, where there is no larch, and in Manchuria and Korea, where the finest *L. dahurica* grows. The small maps might readily convey more information. On the one showing Sequoia and Taxodium it would be easy to add the distribution of important timber trees like Lawson cypress, *Thuya gigantea,* and Western larch.

The author has not tried to explain by notes in the margin the peculiarities of popular nomenclature, such as the use of the term "boxwood" for the Venezuelan *Casearia praecox* (see *Kew Bulletin,* 1914, p. 214); and the application of the word "cedar" to trees so different as Cedrus, Cedrela, and Juniperus. One must acknowledge that the construction of correct maps of distribution is very difficult, as accurate information on some of the tropical woods is difficult to obtain.

Our Bookshelf.

The Natural Wealth of Britain: Its Origin and Exploitation. By S. J. Duly. (The New Teaching Series.) Pp. x+319. (London: Hodder and Stoughton, 1919.) Price 6*s.* net.

THE general scheme of this little book is decidedly good; it is intended to teach young people how the industries and commerce of Great Britain are conditioned by the geology of our island, both because the geological structure determines the sources from which we derive the materials upon which our national existence depends, and because it has produced the surface contours and configuration that have decided the lines along which our streams of commerce flow to-day. The first portion of the book gives an outline of the main principles of structural geology; then follows a section on the fundamental industries based on geological structure; and the third part deals with the geographical and geological relations of some of our most important industrial districts.

In view of the evident educational value of the plan of the book, it is all the more to be regretted that its execution is so defective. The first requisite in a text-book for young people is accuracy, and in this respect the author fails lamentably. A few random examples will illustrate the slipshod nature of the work. Thus the author, in describing granite, states that it consists of three constituents -quartz, felspar, and "the third constituent of granite comprises all the various metallic compounds." Again, a few pages further on, he tells his readers that "sapphire, ruby, aquamarine, and topaz are crystalline forms of clay."

The chapters devoted to mining are by far the worst, and it is not too much to say that there is scarcely a page that is not disfigured by some inaccuracy of more or less importance. It is impossible to imagine anyone with any real knowledge of mining writing that "the *foot-wall* beneath the coal seam is cut away . . . by *pick-axe*" (the italics are the reviewer's), or that pillars of coal "are sometimes left to support the roof." Were it not for the numerous inaccuracies of the kind indicated, this would be a most useful text-book for the general reader, but, as it is, it is greatly to be feared that he is as likely to pick up totally false impressions as to obtain useful information from its pages.

H. L.